

LONG ISLAND GROUP Sinclair TIMEX

L.I.S.T.ING

July
1985

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MEETING NOTES

MAY 5, 1985

The May, 1984 meeting of LIST Group was held at H. Werthamer's in Seaford. The meeting was called to order at 2:30PM with some 30 persons in attendance. The Sec'y-Treas reported that as of the May meeting, member number 100 had been issued!

Jeff Street announced that he will be creating a library data base over the next few months. The intention will be to use Profile (2068) to keep track of the articles which have appeared in other (exchange) newsletters. Members will be able to query the data base, through Jeff, and then borrow only the issues they need on a particular subject. Where copyrights would not be violated, facsimile copies of the original articles will be sent to members who provide return postage and copying fees (estimated at 10¢/page).

Paul D. announced that library tape 3.5 is near completion and will be available at the June meeting for Beta testing. See the article inside.

Stewart Newfeld reported on his visit to the U.K. and Timex, Portugal. He has brought back and/or ordered most of the popular Spectrum software titles. Stewart noted that there is some outstanding, professional software for the Spectrum, citing, in particular, Sinclair LOGO and the Macmillan education series. Zebra systems will be carrying a comprehensive line of Spectrum titles and is developing an "ultimate" emulator (my term), details of which will be published soon.

If Stewart was impressed by the U.K. software he was wildly enthusiastic (for Stewart) about the Timex (P) hardware. He described the plant in glowing detail, from the disk drive burn-in room, where literally hundreds of disk drive units received their 24 hour burn-in, to the professionalism of the production and engineering staff, to having actually run a CP/M system using a TC 2068 in their development area. He feels that Timex P. is here to stay and will be selling the computers and disk drives as soon as final licensing agreements can be worked out.

NEXT MEETING

The June meeting will be on Sunday, June 9th at 2:00PM at In-Flight Service near Kennedy Airport. Maps were provided, last meeting. July's meeting is tentatively scheduled for July 28th; the site will be decided at the June meeting and a map attached to this issue of the newsletter.

MORE NEWS

Nazir Pashtoon asked if there was interest in a hardware workshop, and received a large number of yes notes. He will arrange for an afternoon of soldering, etc. Not sure what will be first, but interface Zero's, RGB adaptors and tape loading filters were discussed.

Nazir also, announced the 2068 Hardware troubleshooting system. He will demo this little marvel at an upcoming meeting. It is capable of taking total control of a 2068 as an aid in troubleshooting and diagnosing system problems. More Goodies to come soon.

The New York City group is undergoing reorganization (New York Metropolitan Sinclair Timex Group). They meet at Branson O.R.T. (Technical Institute), 8th Floor, Room 3, 44 East 23 St, in the city. They normally meet the second Monday (e.g., June 10th) at 7:00PM. Call Mike at (212) 427-0179. Mike says keep trying.

Andy G. and John G. volunteered to investigate starting a LIST BBS. See their announcement. Talk about go-getters!

THE L.I.S.T. BULLETIN BOARD UP AND RUNNING

From: Andy Gippetti
Date: 5/29/85

Today the L.I.S.T. Bulletin Board finally became operational on the Special Interest Group of the Zebra Systems Bulletin Board. The Zebra Systems BBS is a free and very informative telecommunication system devoted to Timex/Sinclair products. Members of L.I.S.T. can now use this S.I.G. to obtain information and/or leave messages to other members or to the Sysops which are John Gaddis and myself. The Zebra Systems BBS phone number is (718) 296-2229, Monday to Friday 5:30pm to 9:00am EST. Also Saturday, Sunday, & Holidays are 24hrs.

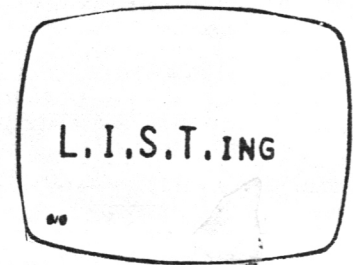
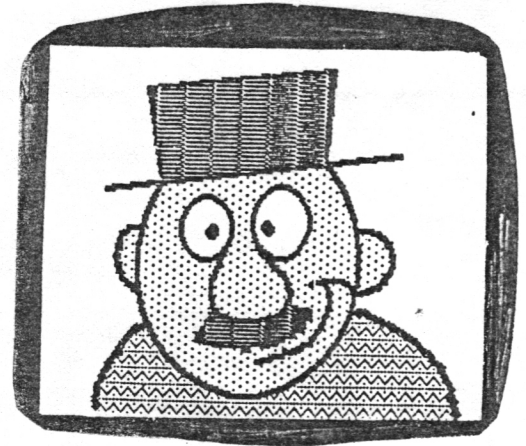
Hope to hear from you,
Andy Gippetti

Next Time

Review of the Z-talker Voice Synthesizer
& more help with Tape Worry M's.

LIST GROUP
P.O. BOX 438
CENTERPORT, N.Y. 11721-0438

ITEM	PAGE
MEETING NOTES & BBS NOTICE	1
INDEX - CLASSIFIED	2
TALK TO ME	
(Voice synthesizers)	4
PARROT REVIEW	3
SUPER PARROT PROGRAM	5
LIBRARY TAPE	7
BOOK REVIEW:	
40 Best MC Routines	8
P. Jennings	
LETTERS TO LIST	9
W. BRZOWSKI ON HARDWARE	13
HACKERS NOTEBOOK	
IF Zero on an Oliger Board	14
COMMUNICATIONS	
Local BBS's	15
Byte Back RS-232 & Tasword II	16
JOYSTICK I/O -M.S. Morris	18
READ DATA (TS 1000)	19
POLICY	20
PROGRAMS	
Old Glory - H. Pulliam	21
Dictionary - P. Donnelly	
VENDOR NEWS (Catalogs Recieved)	22
Map to Meeting	23



If you have a program or article about something you've tried, please send it in. Our group interests are so varied, that I can almost certainly guarantee that someone else can use your expertise to solve his problems.

Classified Ads

FOR SALE...

Seikosha 80 columns dot
matrix printer.
Leading Edge model GX-100
(same as Gorilla)
New ribbon, only \$75.
Contact Andy Gippetti
c/o L.I.S.T. or call
(516) 226-1910

LIST MEMBERS!

Classified Ads to Paid members are FREE, for a one time insertion.* If you are selling new materials (e.g., Software), please, place a standard ad.

*per item or group

TALKING TIMEX

In this issue we've included a series of articles on speech synthesizers. A few of them have appeared before, but even these have been upgraded, where new information has become available. My versions of the Parrot "super" exclusive programs (TS1000 and 2068) will be on upcoming library tapes. We'll finish out the series, next month, with some other interesting information on these units and the results of our side by side tests of the Parrot and Zebra-talker.

*
The Parrot. ~~\$89.95~~ plus \$4 s&h. R.I.S.T. Computer Components, PO Box 499, Ft. Hamilton Sta., Brooklyn, NY 11209-0499.

A voice or speech synthesizer is a combination of software and hardware which your computer can use to talk. The two principle methods of producing voice type sounds on ZX/TS computers are Pulse Code Modulation (PCM) and Linear Predictive Coding (LPC).

PCM in effect uses "silicon chip" recordings of someone speaking a selected number of words. Because an actual voice is used, the sound can be very lifelike. The disadvantage is that ROM addresses are required for all the words you want to use. An article in *Computers and Electronics* (March 1983) gets around this requirement by using TI's Speak and Spell for the business end. Still you are limited to the Speak and Spell vocabulary and/or attenuated versions of those words. PCM gives the best sound, but costs more in memory space and dollars though recent reductions in memory cost will make it more competitive.

LPC uses a combination of random and periodic signals fed to the electronic voice tract. The periodic and random voices can be modulated digitally to produce most of the individual sounds (phonemes) which the human voice can produce. While the range is almost infinite, the sound is very mechanical. The Voicetech units described in *Radio Electronics* (March 1983) use this method.

The Parrot speech module uses LPC allophones "Allphone concatenation" is used to make intelligible words or phrases.

I could not get inside the unit, but the recent merger of R.I.S.T. with Voicetech suggests that the unit combines a general purpose speech development kit (readily available for about \$25), the proper ZX/TS interfacing hardware (another \$25 in parts), and software to produce a very cost effective unit about the size of the Sinclair 16K RAM pack.

The unit comes with a reset button, ZX/TS expansion bus, and provision for an external power supply to power other peripherals through the unit which functions as an I/O port. (R.I.S.T. indicates that ports 0-16 and 32-48 are used, but the initializer program seems to use only location 03 for IN and OUT commands.) 3

The documentation is professional looking and good as far as it goes. However, it does not explain the machine language initializing routine. Most annoying was the lack of a schematic and OEM specs on the voice chips. The "crash course" in voice synthesis might be superfluous for some users and certainly could include a bibliography. The expanded loader program allows cursor editing. This is a big plus. (4)

On the hardware side are three minor flaws: the unit is top heavy; it uses a subminiature external power jack (these are hard to find); it does not come with a speaker.

Using the pilot program which comes with the unit, I was able to make it say "Hello" almost immediately. The voice is, unfortunately, that "tinny," mechanical one associated with first generation robots and Cylons. Some people have difficulty understanding this type of speech at first, but most adapt to it easily.

A friend asked if this unit simply speaks the words you type in. The answer, for now, is no. You must enter the words phonetically, including clicks, stops, and pauses after the appropriate 3 character phoneme. R.I.S.T. promises to develop text-to-speech software. (5)

All in all, this is an excellent unit and performs up to and even over my expectations. I plan to use the Parrot primarily as an annunciator (e.g., warnings, observations), but I can see great potential for games, clocks, and handicapped applications.

(5) Steve Veltri, of VOICETECH, tells me that the Parrot is no longer in production, and that text-to-speech software was never developed. Still, you may find these units in the used equipment market. Voicetech now sells peripherals only for the original Troniel computers, but the GI chips are still available, and in widespread use.

(1) You can buy an SPO-25 X chip

at Radio Shack for about \$12.00.

(2) I had originally guessed however, from the traces used, software and documentation, that one of General Instrument's line of SPO 250 series chips had been used. RIST G.I. provides with the chip.

(3) Decoding is incomplete, and while the system only uses port 03, any port in the range 0 to 16 or 64 to 80 decimal, will cause the Parrot to respond.

(4) I was able to upload the exclusive program to the TS 2068, and since the Parrot is I/O mapped, it was a simple matter to move the 17 byte machine code driver and use the unit with the 2068.

* This is my original review of the RIST Parrot, up-dated to reflect its compatibility with the 2068 and a few other minor changes.

SPEECH SYNTHESIZERS

Your ZX/TS computer can talk to you, with the help of a "Speech Synthesizer" system. Speech or Voice synthesis systems are combinations of hardware and software which, when tied in with your computer, can put electronically generated sounds and noises together into intelligible words and phrases. There are currently at least 16 semiconductor houses producing special LSI (Large scale integration) chips which can talk. (see March 83' Electronic Products)

These chips can all be computer controlled and most use one of 5 principal synthesis techniques. These are: Linear Predictive Coding, Allophone Synthesis, Pulse Code Modulation (PCM), Time Domain Synthesis and PARCOR. The first two methods are the most popular and perhaps the easiest to obtain for your ZX/TS machine and will be the focus of this article.

Early attempts at recreating speech centered around digitally encoding actual spoken words. The problem with such methods was that prodigious amounts of memory (as much as 1M bit/word) were required for a microprocessor to speak in real time. The PCM technique digitizes and compresses speech to the point where perhaps only 20 to 70 thousand bits are required for one second of speech. This is still rather a large requirement for a microcomputer. In addition, the entire vocabulary, just as it will be spoken, must be stored in memory (usually ROM) somewhere.

LPC uses an electronic model of the human vocal tract to produce sounds. In LPC, just as with PCM, the words we want the computer to say must be stored in ROM. In LPC however, instead of a compressed duplicate of actual human speech being stored in ROM, only the parameters for producing the sounds are kept.

These parameters tell the "electronic mouth" when to perform the electronic analogue of exhaling fully, vibrating vocal cords, placing the tip of its tongue against the back of its teeth, etc. Straight LPC requires that the desired word be spoken, by a human, into a special computer controlled filtering system and then stored in a ROM. Memory requirements are less than PCM, but so is speech quality. Straight LPC for your ZX/TS is perhaps best illustrated by the TI Speak and Spell interface article given in the Feb. 83 issue of Computers and Electronics magazine. TI's TMS 5220 chip works well with Z80 processors and can be used, for example, with their VM 71003 ROM chip to create a "talking clock" (see Radio Electronic's May and July 83').

'Phoneme' or 'Allophone' synthesizers start with as few as 64 basic sounds (the phonemes) or their variants (allophones) which can be used to make up most of the words of a spoken language. These use a number of techniques, including LPC, to concatenate these fundamental sounds into words. In this case, there is virtually no off chip ROM requirement, as simple 8 bit codes representing the phoneme can be stored in your computer's RAM and fed through the synthesizer one at a time. Speech quality is often not as high as ROM word based LPC or PCM, due to the limited number of phonemes or ways of combining them. The General Instrument/Voicetech units mentioned in March Radio Electronic magazine and used in the R.I.S.T. Parrot, and Votrax's SC-01 chips are of the LPC allophone type. G.I. also makes ROM based LPC chips (SPO 250) (see the June R.E. article on talking computer games)

The synthesizer chips themselves have been dropping in price faster than TS1000's in recent months, with chips which used to sell for up to \$100 now going to OEM's for less than \$10 and in some cases less than \$5. Complete Synthesizer units consisting of the synthesizer itself, operating system and ROM (if required) can now be purchased for from between \$30 (Cheaptalk) to \$100 (Digitalker). Most of these can be easily interfaced with a ZX/TS through a Z80 PIO or other peripheral interface.

What can you use speech synthesis for? In a security system, a synthesized voice can warn you of impending problems verbally. Other annunciator uses include over-temperature, hi-water level, "lights on", etc. all of which can warn you of situations requiring your attention. In Education uses, a voiced response can be more "friendly" for young or novice students. Speech or visually handicapped people can even use their ZX/TS to communicate with the world. How about adding some interesting byplay to your favorite game, or make the "voice" your third eye when running complicated action/adventure games. The voice can describe your general circumstances, while you concentrate on the visual information presented on the immediate screen.

"Which is the best technique for long term?" has been a big question in the field of voice synthesis for a long time. Generally, as we said, the more memory intensive systems sound better, but cost more, and are relatively inflexible. The allophone systems are cheaper and more versatile, but produce speech that is far from human sounding. The dividing line between the ROM based and allophone systems seems to be blurring as hardware manufacturers strive to get the best of both worlds. As an example, consider that prefixes (e.g., the AT in ATTACK) of

*Zebra-TALKER

Your reviews, programs, comments, hardware projects, etc., are eagerly solicited for publication in LISTing.

PARROT "SUPER" EXCLUSIVE PROGRAM

R.I.S.T.'s "Exclusive" program, supplied with the PARROT, is an excellent editing tool for creating an output phrase or sentence. One big problem with the program though, is that you can only play with one phrase at a time. The 'Super' Exclusive program addition, shown on the next pages, uses the ZX/TS's array handling capabilities to allow you to edit and "speak out" with as many phrases as your memory can hold.

The addition consists of new lines which you must type into the "exclusive" program. These allow you to put the allophone codes for a number of phrases into one long "phrase bank" array called T. The position of each "phrase" with T, and its length, is recorded in array variable B. A detailed explanation of the variable and major segments of the program addition are given below. We have also provided an illustration of the phrase select menu and some typical allophone phrases.

Do note that you can only RUN the program once and that it is during this initial RUN that you specify the maximum number of phrases you will "ever" want. After the initial run you must GOTO 300 to start again. I chose 10 phrases, 32 "codes" long for this example, but quite a few more could be selected. If you want to generate phrases and store them as variable arrays which can be switched between programs (e.g., create game phrases with this program and then imbed them in the game program later) you'll need a utility program like RAM-Drive. (or See the May 83 issue of Microcomputing, "A Sinclair Quick Fix")

PARROTSUPER EXCLUSIVE PROGRAMNEW VARIABLES

N = number of phrases you wish to have (KEYNO is one of these)
 T = a numeric array capable of storing N allophone code elements 32 units long. (we'll call these "phrases")
 B = A numeric array which will contain two numbers for each of N allophone code elements. The first number is the starting position, within T - called START, and the second is the length, called HOWLONG, of "phrase" number KEYNO.
 B\$ = a six character string for the "name" of the phrase whose KEYNUMBER we're looking at.

KEYNO = is the Key number of the particular phrase we want, it will range from 1 to N.

All other variables are as originally used by RIST's Sections of the program.

INITIALIZE

This portion sets aside a long numeric array (T) which can hold the codes for 32 X N allophones, sets up a string (B\$) for naming the allophone subsets of that linear array, and sets up a small array (B) which keeps track of each phrase's position and length within the long array T.

Lines 333 through 337 offer other choices during editing.

ADD (from line 333) - Here we select, KEYNO, the key number of our particular phrase. The end of the last phrase is shown. The option here is to either start the current phrase, under edit control, right after the end of the previous phrase, or to start somewhere else (line 122ff).

Having selected a starting position in long array 'T' we must now specify its LENGTH (line 1240) and name (1310). Line 1300 does all the work by putting our current phrase S(N) into the "phrase bank" array T.

many words in some ROM based systems can be addressed individually. We might be getting very close to using phonemes with such slicing. Similarly, with certain pairs of English letters, there is no specific combination of two individual letter sounds, which produces the correct sound for both if they appear in a particular word (this is called - coarticulation). The only way to get really accurate reproduction of these sounds is to add them to our basic list of allophones in ROM.

We could continue this argument ad nauseam (maybe I already have), but the point should be clear; a judicious blend of hardware, software (e.g., in a small on-board ROM), and expandability should provide a system capable of realistic, infinitely variable speech. This is, we understand, the sort of approach which Votrax, one of the leaders in the field, is following with its second generation systems which are due out this summer.

One final note, while adequate hardware and quite a few word libraries exist today, there is very little adequate software for users and even OEM's. The development of user friendly, comprehensive software packages for the various personal microcomputers will greatly enhance the usefulness of your "talking" computer.

OTHER BACKGROUND READING:

- 1) "Speech Synthesis Techniques", Radio Electronic, Feb. 82 - P.62ff
- 2) "Speech Synthesizer" (Construction), R.E. July 82, P43ff
- 3) Teaching Your Computer to Talk, Teja
- 4) "Games That Talk", RE June 83
- 5) RIST'S PARROT Manual
- 6) Back Issues of BYTE, Ciarcia's Circuit Celler - "THE MICRO MOUTH"

'SUPER' EXCLUSIVE PROGRAM
ADDITION FOR RIST PARROT
INITIALIZE

```
150 PRINT "HOW MANY PHRASES?"
152 INPUT N
153 DIM T (N*32)
154 DIM B (N,2)
155 DIM B$(N,6)
156 LET START=0
158 LET HOWLONG=0
333 IF I$="A" THEN GOTO 1200
335 IF I$="S" THEN GOTO 1400
337 IF I$="Q" THEN GOTO 1480
```

ADD

```
1200 REM CHECK &/OR SET INITIAL PARAMETERS OF PHRASE
1201 PRINT "ADD(A) OR DELETE(D) PHRASE"
1202 INPUT Y$
1203 IF Y$="D" THEN GOTO 1326
1205 PRINT "STRING NO.?"
1207 INPUT KEYNO
1208 PRINT KEYNO
1209 IF KEYNO=1 THEN GOTO 1227
1211 PRINT KEYNO
1213 LET START=B(KEYNO-1,1)+B(KEYNO-1,2)+1
1214 PRINT "PHRASE NO. ";KEYNO-1;"ENDS AT";B (KEYNO-1,1)+B(KEYNO-1,2)
1215 PRINT "START THERE?"
1220 INPUT Y$
1225 IF Y$<>"N" THEN GOTO 1240
1227 PRINT "START WHERE?";
1230 INPUT START
1235 PRINT START
1240 PRINT "LENGTH?"
1245 INPUT HOWLONG
1250 PRINT "PHRASE NO. ";KEYNO;"STARTS AT";START;"AND IS";HOWLONG;"UNITS LONG"
1255 PRINT "HIT N IF THAT'S NOT RIGHT"
1260 INPUT Y$
1265 IF Y$<>"N" THEN GOTO 1275
1270 GOTO 1205
1275 REM SET PARAMETERS OF DATA DICTIONARY
1280 LET B (KEYNO,1)=START
1285 LET B (KEYNO,2)=HOWLONG
1295 FOR I=START TO (START + HOWLONG)
1300 LET T(I)=S (I-START+1)
1305 NEXT I
1310 PRINT "ENTER NAME OF PHASE NO. ";KEYNO
1312 INPUT B$(KEYNO)
1325 GOTO 300
1326 LET P=1
1327 LET L=0
1328 GOTO 300
```


OUT (SPEAK)

This section gives us either a listing of what our phrase bank 'T' looks like (see PARROT PHRASES attached) or allows us to select one of the phrases. In the example, N was selected as 10, but only 8 phrases have been entered (#8 is being entered right now).

At line 1410 we select which phrase we want, and lines 1420 through 1430 takes that subset of T which begins at T(B(KEYNO,1)) (the starting position of string KEYNO), and runs B(KEYNO,2) units further down the line and puts that subset into the "current" array 'S'.

After all this, you return to line 300 which is the Main loop of RIST's program. Oh yes, line 1480 gives a random selection of the phrases. Sample Phrases and Phonemes, along with their translation, are also given on the attachment.

PARROT PHRASES

PHRASE NO.	DESCRIPTION	START	LENGTH
1	Danger	1	34
2	Warning	36	27
3	Hello	64	35
4	LRUD	100	19
5	Fire	120	35
6	Kling	156	44
7	Blank	201	1
8	Dragon	202	1
9	-	-	-
10	Sound	-	-

PHRASE

PHONEMES

Danger
Warning

DDZ EY NG PA1 JH ER2 PA1 WW OR NN1 IH NG PA2
OW VV ER1 LL OW PA1 DD1 PA3 IH PA1 NN1 PA3
DDZ EH MM PP ER2 PA4 TT2 UW2 PA5

Translation

(Danger, Warning. Overload in Damper Two)

Hello

HH1 EH LL OW PA5 (same as book)
(Hello:welcome. Your wish is my command)

LRUD

LL EH FF TT2 PA5 RR1 AY PA1 TT2 PA5
AY PA1 PP PA5 PA3 DDZ AW NN1 PA5
(Left, Right, up, Down)

Fire

PA2 FF AY RR1 PA5 WW AX NN1 PA4 PA5 SS SS SS SS PA4 PA5
FF OW TT2 AA NN1 PA5 TT1 OR PA1 PP IY DD2 CW SS PA5
AX WW EY PA5
(fire one, (whish), Photon Torpedos away)

Kling

PA1 FF AY RR1 PA2 TT2 UW2 PA4 PA5
SS SS SS SS PA5 PP PP PP AA3 SH ZH ZH PA5 BA5
HH1 LH PA1 TT2 PA4 AA NN1 PA5 KK 3 LL IY NG AA NN1
PA4 KK3 RR2 UW2 ZZ ER1 PA5
(Fire Two (SS PP ZH) Hit on Klingon Cruiser)

OUT (SPEAK)

```

1400 REM CONVERTS S(I) TO SELECTED PHRASE
1402 PRINT "LISTING (L) OR SELECT (S)"
1403 INPUT Y$
1404 IF Y$ <> "S" THEN GOSUB 1500
1405 PRINT "WHICH PHRASE WOULD YOU LIKE?"
1410 INPUT KEYNO
1420 FOR I=1 TO B (KEYNO,2)+1
1425 LET S(I)=T(B(KEYNO,1)+I-1)
1430 NEXT I
1431 LET L=B(KEYNO,2)
1445 GOTO 300
1480 LET KEYNO=INT ((RND*(N)+1)
1485 GOTO 1420
1500 REM LIST IS DISPLAYED
1505 CLS
1510 PRINT "PHRASE NO. DESCRIPTION START LENGTH"
1511 PRINT
1512 FOR I=1 TO N
1513 LET KEYNO=I
1515 PRINT TAB3;KEYNO;TAB8;B$(KEYNO);TAB17;B(KEYNO,1);TAB23;B(KEYNO,2)
1520 NEXT I
1525 RETURN
2006 IF P > +1 THEN LET P=L
2025 IF P=0 THEN LET P=1
2027 IF P=1 AND L=1 THEN LET P=2

```

THE CONSTRUCTION OF ARRAY 'T'

POSITION

KEYNO	CODE:(dec)	ALLOPHONE	TRANSLATION	NAME
1	1	DD1	D	DANGER
2	20	EY	A	
3	33	DD1	D	DANGER
4	44	NG	N	
5	10	JH	G	
6	52	ER2	FR	
7	0	PA1		
8	
9	13	TT2	T	
10	31	UW2	WO	
11	4	FF	F	
12	34	UW2	WO	
13	35	FF	F	



HISTORY & BACKGROUND

The LIST library tape was the brainchild of our newsletter editor, P. Donnelly. Over the course of the first few months of LIST's existence, LIST had received a number of programs written by members. The problem of how to communicate these to all the members, especially when more than 1/2 are "corresponding only" types, was quite complicated. Publishing listings in the newsletter was helpful, but still required a lot of duplicate key strokes for the majority of members.

Paul decided to try a unique, and low cost distribution method. He chose five members names (corresponding) and sent them a copy of the first Library tape (Version 1.6) and a blank C-60. To keep the cost to the group, and individuals, down, only one set of tapes was sent out. Each member, upon receipt, was to use the tape, copy what he liked and then mail it on to the next member on the list. The "price" for obtaining this full C-60 of programs was: 1) Cost to mail the two tapes to the next member 2) Each member had to add at least 1 program of his own (not commercial software) to the blank tape.

Library tape 1.6 (and 1.7) was all 2068. Since then, number.2.1 was also distributed for the 2068/Spectrum. Also, tape number ZX1, for the 1000 has made the rounds to TS1000 only owners. Each member is allowed to keep the tape one week before mailing it on.

RESPONSE

Response to the initial mailing was outstanding, and version 1.7 (1.6 plus the programs which came in with the first mailing) was soon sent to all active members (Fall of '84). Tape 3.5 is now produced (May '85) and will shortly be distributed.

PROBLEMS

While the system provided access to a number of excellent home, entertainment and utility programs to many members, there were problems:

1. Some tapes have been lost. At least two sets were simply never returned.
2. Some sets have been very very late. While average turnaround time is two months (5 members a/week each plus mail time), some have taken four months to get back to Centerport.
3. Some tapes have been erased by members who mistakenly used the library tape.
4. Some members cannot LOAD or SAVE properly, either the library tape, and/or their own software.
5. Some pirating has occurred. While the LIST tape is not commercial software (we weed out any commercial programs which may be inadvertently sent in by members) it is not "Public Domain" either. The programs belong to the Group, just as an issue of our magazine, LIST, does. I.E. copying outside the group is not permitted.

```

Program: LIST3.5
Program: align
Bytes: alignsears
Program: LISTS
Program: STAR TREK
Program: formulary
Program: KEND
Program: GRAPH IT
Program: draw
Bytes: DRAW
Program: xmas
Program: xlist
Program: SPAN TUTOR
Program: GEOGRAPHY
Program: OSC-10C
Program: RESVAL

```

```

Program: VIDEO FILE
Program: OLYMPIAD
Program: TAPE SCHED
Program: bankrec
Program: tag
Program: Hex-spec
Program: HEX2
Program: VARS
Bytes: VARS
Program: char
Program: tomorrow
Program: PRO TECH
Program: DEMO
Bytes: pb
Bytes: CODE
Program: missile
Program: bye

```

SOLUTIONS

- 1.& 2. We will be setting up more rigid control of "Loops" so that tracking of returns can be made.
3. The write protect tabs on Library tapes will be broken off.
4. LISTING will carry a series of articles on tape LOADING and SAVEing. An "Alignment" program, made on our LIST standard deck, is included in all upcoming tapes. Members are encouraged to set a second deck up on this standard if their deck does not LOAD LIST programs.
5. It has been estimated that at least (10) ten copies are made of every pirated tape. If people outside the group obtain the tape they deny the rest of the hard working, honest, contributing members access to the programs of these ten people who stole the copies. Why not invite these people to join LIST instead, the cost is nominal.

THE FUTURE

Tape number 3.5 is due out in June '85. New "Loops" will be established. Since a few of the programs on number 2 were distorted by our duping deck, we have included them on tape number 3.5. Also, some of the 1.7 programs were tacked on to 3.5, so it is an almost complete compendium of available programs. Tape 3.5 also has a few "Spectrum only" programs.

Tape number 4.X will be out by year end. In addition to new material it will contain the remainder of the 1.7 programs. This means that everyone who signed up for the 1985 year will have received all available programs before the end of the membership year (even allowing for delays, etc.).

Tape ZX2 will be generated in June 1985. "TS1000 only" members should make sure they have identified themselves to us before then.

DOCUMENTATION

There is virtually no external documentation for the library program. Many are well documented within the program. Some almost defy understanding, yet still work. If you'd like to add to a program, to make it clearer, please feel free to submit your changes on the blank tape. Do try to make it a "MERGE" program or introductory LOADER program and we'll publish it on a later version. Remember, the lack of documentation serves two purposes, 1) it makes the tape less useful to thieves 2) it encourages you to learn programming techniques and analysis.

```

Program: mcloader
Program: mcedit
Program: bold
Bytes: bold
Program: BIGCHAR
Bytes: BIGCHAR
Program: BIGCHAR
Bytes: CHAR
Program: word
Character array: word
Program: clock
Program: confusion
Program: curve
Program: GaxisBright
Program: randcolor
Program: Turtle Hop
Program: Varalist
Bytes: vars
Program: Jack
Bytes: Jack.ude
Program: Jack.ude
Program: CURVE
Program: Header-t

```

```

Program: Header
Program: Calendar
Program: RACING
Bytes: CODE
Program: EXPLOSION
Program: DISTANCE
Program: MBUDGET1
Program: 3D-TIC-TAC
Program: Calendar2
Program: Word 5+
Bytes: PROCODE
Program: xmas
Program: INSTRUCT
Program: HANGDATA
Program: HANGMAN
Character array: fruit
Program: mutil
Program: renum
Program: morechars
Bytes: M
Program: word
Program: sendvars

```

```

Butes: m
program: word
program: HANDS ON
program: OLD GLORY
program: speed draw
program: draw
Butes: draw
program: 3.1
program: KEYWORDS
Butes: START
Butes: MAIN
program: HEADER
program: variables
Butes: var disp
program: sample
program: hangout
program: vars
Butes: VAR
program: VAR
program: endnote
program: endnote

```

BOOK REVIEW

Title: 40 BEST MACHINE CODE ROUTINES FOR THE ZX SPECTRUM
Author: JOHN HARDMAN & ANDREW HEWSON
Publisher: HEWSON CONSULTANTS, OXON, UK.
Price: 5.95 POUNDS STERLING, SOFTCOVER, 144 PAGES.

This book was first published in 1983 and turned out to be not only a bestseller but an award winning trend-setter to boot (ahem! no pun intended). Back then, no-one went out of their way to make machine code easy for others to pick up and use - let alone a successful software house: just not done old boy - suicide if you ask me! Well, Hewson did, and many have since reaped the rewards of "mc-without-tears". Other publishers followed suit when they saw that micro users were thirsty for such knowledge and the extended personal capabilities it afforded - and the software market never missed a beat.

Despite the title this book is not just a pretty list of useful routines written in Z80A machine language. It is aimed squarely at a broad audience, catering for beginners and experts alike, allowing either the simply curious to learn a little more about the machine they are using before going on to the routines, or, the impetuously impatient to jump right in and dazzle themselves with their creative genius. Well-not quite, since both must first enter a lengthy, though versatile, BASIC machine code loader program which loads each routine into RAM. And...er...oh yes! a working knowledge of BASIC is assumed, sufficient to call the routines and make full use of them in the user's BASIC programs.

For both convenience and clarity the book is divided into two sections. Section A includes an introduction; a short explanation of the internal structure of the ZX Spectrum; and a concise rundown on Z80A machine language. All in the first thirty pages or so. The bulk of the book - Section B - opens with an introduction that includes the BASIC machine code loader program, followed by the routines. These are subdivided into four groups, each covering a common subject: scroll routines, display routines, routines to manipulate programs, and toolkit (utility) routines. All are listed in both assembly language (whaa!!!) and decimal code, though only the latter are used with the loader (whew!! no hex in the text). Most routines are fully relocatable (here we go again!) and those that are not may be placed at another address by utilising some additional BASIC included in the text (sigh!!). Every routine includes full information on its length, in bytes; the number and description of the variables used; the decimal checksum; operation performed; the call to use; included error checks; comments on possible variations; the assembler and decimal code listing; and notes on how the routine works. An appendix of useful tables rounds off the book. The whole is short, sweet, and thorough. This is not, however, a teaching manual.

An example now of how the book might be used. First, the BASIC machine code loader program is entered and saved for future use. When RUN the program PRINTS to the screen the lowest address at which a routine may be stored - one more than RAMTOP - and the amount of memory space available between that point and the end of RAM. On initial setting the space available is the 168 bytes reserved for user defined graphics which the program allows the user to overwrite if so desired.

More usually a lower address is entered from the keyboard, a figure obtained by deducting the selected routine's byte length from the lowest address posted on the screen. It can also be low enough to accommodate more than one routine, or even down to the program's lower limit.

With the preliminaries out of the way the program now PRINTS to the screen the main display. This shows three columns of numbers, headed - left to right - Address, Decimal, and Checksum. In the first column the numbers begin with the address selected by the user as the starting address; the next shows a flashing cursor across from that address to indicate the current memory location to which the next decimal code number will be entered; and finally a column showing a running total of the decimal code entered to that point. The bottom of the screen shows the various keys to press to access the different options available to the user, with an input cursor as the last item on the screen.

From now on the user may enter decimal code from the routine listings; move backward or forward by one or more address locations; insert or delete a specified number of bytes; or terminate the loader program. All by simply pressing the appropriate key and following the screen prompts.

To load a routine into memory the user enters in each of the decimal code numbers in the list for the chosen routine, one at a time, and the program places each into the RAM address corresponding to the position of the flashing cursor. The cursor moves down the screen after each entry, and the screen scrolls upward one line when filled. The last code number in routine returns control to BASIC, and the loading program is terminated from the keyboard.

The routine is now tucked away in RAM and the user is advised to save it to tape or micro-drive before using it for the first time. Now fashion a BASIC program to implement the routine's particular features and away you go. The book gives some hints on how to do this, but the user has really reached the point at which the old gray matter gets a workout. Watch in awe as your screen scrolls left, right, up, or down by attribute, character, or pixel. Merge your pictures, fill a region, or magnify a section of the display and copy it to another part of the screen. Delete a block or two, or three, or...exercise a REM kill...conduct a ROM search...and more.

And does it work? I hear you cry. Well...yes, yes, and maybe. It really depends on the machine you're working with. Of those routines your reviewer tested all worked well on a "straight" (UK) ZX Spectrum, and a T/S 2068 fitted with a Spectrum ROM.

But on a "straight" (US) 2068 the jury is still out, since some of the routines use Spectrum ROM routines which may or may not be located at the same address in both machines. Further study is needed before an answer is available on that one, and a comparative ROM atlas, like that produced by N.PASHTOON, would be useful in that respect. Also the loader program's lower address limit would need to be modified to suit the T/S 2068's available BASIC programming area. Still, for those who have the machinery to allow them to use the routines without alteration, this book is perhaps the closest thing to instant gratification this side of packaged software. The concept is wonderfully simple - the results are splendidly speedy. Well worth the modest asking price. And those who might have to put in a few hours of research would undoubtedly find it worthwhile.

To obtain the most reliable information on the book's availability and cost write to the publisher direct. Their full address is HEWSON CONSULTANTS, 60A ST.MARY'S STREET, WALLINGFORD, OXON, UK.

PETER JENNINGS.
April 1985.

LIST GROUP
P.O. BOX 438
CENTERPORT, N.Y. 11721-0438

Make sure your level (volume) is high enough. Try fresh batteries or a slightly high power supply (7.5V instead of 6). Most good recorders can safely handle the increase (no quarantees though). Also, make sure your line voltage is up to snuff. Disconnect high load devices when loading (e.g., Electric heaters).

Dear LIST

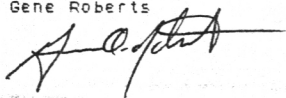
Your May/June newsletter was outstanding! Are the Disc Drive s available from "English Micro Connection" really available, if so will they work in the USA? Or or are they just listing them prior to their being imported to the USA?

Anyway your newsletter is excellent source of information that is a big help.

Some one may already use the word processor that I am using now but I'll explain it anyway. I'm using Vu-File setting up one field in the upper right hand corner then the next line right below, then one field and a space and a field every other line until the last one is at the very bottom of the RECORD area. And then I use the various functions of Vu-File to edit etc. and so far it works ok.

I use the upper corner for page numbers and then when the print parameters are set up it is excluded so that the page numbers are there while you are typing and in the file if you save it but are left out when it is printed.

Gene Roberts



List
Group



April 16, 1985

W. PHIL MCCONAGHEY

PEMBROKE PINES, FLORIDA 33023

RE: A & J MICRODRIVE 2000
FOR THE 2068 T/S COMPUTER

Dear PAUL

When you buy a second Microdrive from A & J it arrives without any instructions. To enable your first drive 0, you must POKE 24201,0. To use your second drive 1, you POKE 24201,1. Be careful because on start up or if you RAND USR 0, drive 0 is automatically chosen.

Mr. Jim Howell of A & J Microdrive has advised me they will begin selling a centronics (parallel) printer interface and chip in the middle of April for \$39.95. The printer interface mates with the edge connector on top of the microdrive interface. The chip must be inserted in an existing socket in the A & J interface.

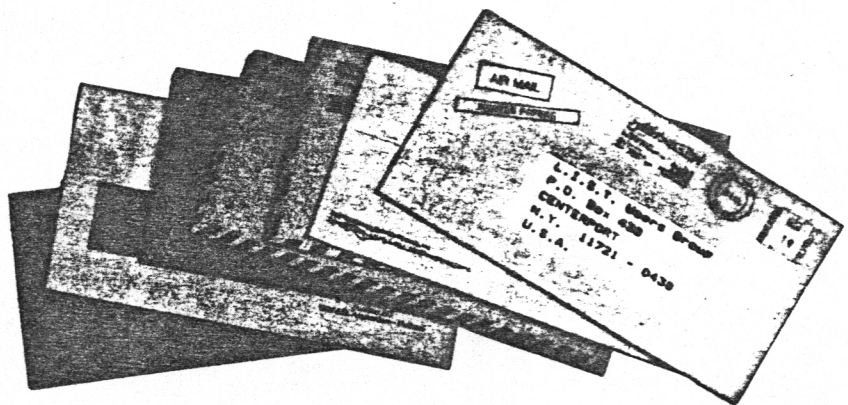
Cordially,



W. Phil McConaghey, P.E.

WPM/tpo

Yes Richard, you should have received tape #2 (but, see the story). #3 will be out soon and will bring you up to date. Richard's question on how to move Code was solved by the effective, if inelegant, expedient of SAVING the Code to tape and then LOADING it back. Remember YOU tell the 2068 where to put the Code, it doesn't matter where it came from. (I.e., If you say LOD " " CODE, then the computer puts the code at the addresses it finds in the tape header. But, if you say LOAD " " CODE 30000, then the header is ignored and the CODE is placed at 30000 ff.



How "letters" work - A Bootstrap

We receive dozens of requests for information each month. Some are general in nature, but most ask us specific questions about hardware, software, and compatibility.

Since we don't (and can't) have all the different types of HW & SW available, your editorial staff simply can't answer all the questions raised. We try, e.g., by sending pages from back issues of LISTing or referring the questions to another source of information, but we need your help.

If you see a question in the letters section, and you know the answer, please send the answer to LISTing and/or the individual. If you send it to us, we'll publish it and pass it on.

Oh yes, we don't print members street addresses unless told specifically to do so.

LIST

7/85

LETTERS



Published by Argus Specialist Publications Ltd
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ALBERTSON COMMUNICATIONS INC.

SPECIALISTS IN PUBLIC SAFETY COMMUNICATIONS

225 VALLEY PLACE
MAMARONECK NY 10543
914 698-7707

MAY 4, 1985

PAUL DONNELLY
L.I.S.T. GROUP
PO BOX 438
CENTERPORT NY 11721-438

DEAR PAUL,

AGAIN I WOULD LIKE TO THANK YOU FOR THE INFO SENT ME ON THE TASMAN CODE "BYTES"

IS THERE ANY WAY I CAN BUY, BEG, BORROW, OR STEAL A COPY OF THE PROGRAM "HEADER" THAT YOU USED TO GET THAT INFORMATION?? THERE ARE OTHER PROGRAMS THAT I COULD YOU IT WITH.

ALSO, WHILE I HAVE YOUR ATTENTION, DOES ANYONE KNOW WHICH I.C. IS USED IN THE T/S 2068 FOR "LOADING"?? I HAVE TRIED A NUMBER OF DIFFERENT 2068'S ALL WITH THE SAME PROBLEM... WILL NOT LOAD WHEN "HOT" AFTER BEING USED FOR A HOUR OR MORE... WILL LOAD PERFECTLY AFTER BEING TURNED OFF FOR A FEW MINUTES.

I HAVE ACCESS TO SOME VERY GOOD HEAT SINKS AND HEAT CONDUCTIVE ADHESIVES... I AM SURE MANY OTHERS ARE EXPERIENCING THIS PROBLEM AND I WOULD HAPPY TO SHARE MY EXPERIENCE WITH THEM AFTER I FIND A SOLUTION TO THIS PROBLEM.

ALSO WOULD ANY ONE KNOW WHERE I MIGHT FIND THE SCHEMATIC AND PARTS LIST FOR THE T/S 2068?? I HAVE A FULLY EQUIPPED SHOP HERE WITH ALL THE NECESSARY TOOLS AND TEST EQUIPMENT... IF ONLY I KNEW WHERE TO START... AND AGAIN I WOULD BE GLAD TO SHARE MY "TOOLS" WITH ANYONE WHO CAN HELP ME WITH THE "BRAINS"...

ATTACHED IS A PRINT OUT USING THE "CODE" INFO YOU SENT ME.. YOU PROBABLY KNOW ALL ABOUT THIS ALREADY... BUT IT WAS A NEW EXPERIENCE FOR ME.. USED T/S 2068, TASMAN INTERFACE, TAS-SHINWA "CODE", WITH A MANNESMANN/TALLY SPIRIT 80 PRINTER...

ALSO A GOOD PROJECT FOR SOME ONE OUT THERE IN THE FUTURE MIGHT BE TO COME UP WITH A SHIELDED CABLE FOR THE PRINTER INTERFACE.. THIS IS DEFINITELY THE CULPRIT THAT CAUSES ALL THE RF INTERFERENCE WITH TVIRADIO COMMUNICATIONS; AND POSSIBLY THE LOAD AND SAVE PROBLEMS.. I HAVE BEEN UNABLE TO FIND THE NECESSARY HARDWARE FOR THE CABLE... THE CONNECTOR END AT THE INTERFACE MODULE IS THE PROBLEM... THE CABLE AND PRINTER CONNECTOR ARE READILY AVAILABLE.

Dear Sir

Thank you for your letter, I hope to be able to publish it in a future "letters" page.

Also I would like to use some of your information for our "club corner".

Best Wishes & Thanks

Yours faithfully
Ray Elder

DEAR PAUL,

MAY 6, 1985

RECEIVED MY APRIL LIST EDITION TODAY AND MANY THANKS FOR IT. ALSO THANK YOU FOR YOUR ANSWER TO MY QUESTIONS WHICH YOU PUT ON THE LAST PAGE. GUESS YOU WANT TO BE SURE I READ IT ALL EH? WELL, I DO: ALWAYS.

I HAD IN MIND TO PEEK AND POKE THE CODE AROUND TO RELOCATE IT AND YOU SURE SAVED ME A LOT OF TROUBLE WITH YOUR SAVE/LOAD ROUTINE. GUESS I SHOULD HAVE REASONED THAT ONE OUT MYSELF BUT I KNOW BEANS FROM CODE. SURE HOPE I CAN GET INTO MC BEFORE LONG. I HAVE A BOOK AND WILL KEEP TRYING.

LIKED THAT PROGRAM FROM FORUM ON PAGE 21 OF THE APRIL ISSUE. BUT IT DOES TAKE A LONG TIME TO RUN. (8:20). YOU CAN MAKE A QUICK RUN BY CHANGING LINE 45 AS FOLLOWS:
ORIG: 45 IF NOT bit THEN CIRCLE W-I*2, A-K*3, 1
NEW: 45 IF bit THEN PLOT W-I*2, A-K*3
(it's not as pretty but the letters are there.)

ALAS, MORE TROUBLE WITH MY A&J. THIS TIME EITHER THE INTERFACE OR DRIVE 1. I HAVE SENT THEM BOTH BACK TO A&J FOR CHECKOUT. PERFECTLY GOOD WAFERS WERE NO LONGER LOADING/SAVING PROPERLY. TOO MANY MISSES. MIGHT AS WELL USE THE CASSETTE. OH WELL! MAYBE IT'S ME PAUL. I'LL STILL WAIT A LITTLE LONGER BEFORE I MAKE MY FINAL JUDGEMENT. DID I SEND YOU MY ALARM CLOCK PROGRAM?? IT'S HANDSOME AND FUNCTIONAL TOO. I HAVE PLENTY OF PROGRAMS TO SEND WHENEVER YOU NEED SOME. I THINK I ALREADY PUT MY BUDGET PROGRAM ON LOBRARY TAPE ONE.

BY THE WAY I HAVEN'T SEEN A LIBRARY TAPE SINCE #1. SHOULD I HAVE??

THANKS FOR ALL YOUR INVALUABLE HELP PAUL.

REGARDS,

Richard

RICHARD J. CUNNINGHAM

SINCERELY YOURS,

STAN NAGROD

Argus Specialist Publications Ltd.

No. 1 Golden Square, London W1R 3AB. Tel: (01) 437 0626. Telex 8811896

Dear Sir

Enclosed is a copy of our popular magazine 'ZX COMPUTING', the magazine which no Sinclair user should be without!

We have pleasure in offering you an Annual Subscription to our magazine (six issues per annum) for only £15.00 - \$19.00 (U.S.) or equivalent.

Furthermore, should you wish to order larger quantities for your group then we would be pleased to supply ten copies or more at a discounted rate of 25%. Special rates are available for larger quantities on enquiry.

Please find enclosed an order form which we hope you will take advantage of.

John Silver
Magazine Sales Manager

FOR YOUR REPLY

MAY 2, 1985

DEAR MR. PASH/TON,

HAVING RECEIVED SOME SAMPLES OF THE LIST NEWSLETTER, IT'S CLEAR THAT YOU HAVE ACCESS TO MUCH OF THE LATEST T/S 2068 INFORMATION, ESPECIALLY IN THE AREA OF SPECTRUM EMULATION. I HAVE SEVERAL QUESTIONS THAT YOU MIGHT BE ABLE TO ANSWER. (BOTH MYSELF AND ANOTHER 2068 OWNER WILL BENEFIT FROM YOUR REPLY - I'VE ENCLOSED A STAMPED ENVELOPE) HERE GOES:

- 1) ARE ALL SPECTRUM HARDWARE ADAPTERS FOR THE 2068 ALIKE? (IS THE ADAPTER AVAILABLE FROM "THE ENGLISH MICROCONNECTION" A GOOD ONE?)
- 2) WHAT ABOUT USING THE RS232 PORT ON "INTERFACE -1" TO HOOK UP A SERIAL PRINTER? IS IT AS EASY AS USING A PARALLEL INTERFACE?
- 3) CAN YOU RECOMMEND ANY HARDWARE DISCOUNT DEALERS IN ENGLAND? (I HAVE A SISTER VISITING EUROPE; IS THERE ANY ADVANTAGE TO HAVING HER PICK UP ITEMS AND MAIL THEM HOME HERSELF?)
- 4) I NOTE THAT SINCLAIR LTD. IS OFFERING THE "SPECTRUM+" KEYBOARD/UPGRADE FOR \$20.00; CAN THIS BE EASILY HOOKED TO THE 2068?
- 5) HAS ANYONE ASSEMBLED A MEMORY EXPANSION UNIT FOR THE 2068? IT WOULD BE NICE TO HAVE A "RAMDISK" ADD-ON!
- 6) IS THERE A BSR HOME CONTROLLER INTERFACE FOR THE 2068 OR SPECTRUM?
- 7) AND JUST ONE MORE THING: I HAVE THE LISTING OF YOUR HEADER PROGRAM(S), BUT THE COPY I HAVE IS CUT OFF AT LINE 1010; CAN YOU TELL ME THE REST OF IT?

IF YOU CAN TAKE A FEW MOMENTS TO ANSWER ANY OF THE ABOVE QUESTIONS, I'LL BE VERY GRATEFUL.

THANKS AGAIN!

William C. Schumay
9788 STALEY RD
FRANKLIN, OH 45005

STAN - As far as I know, schematics and the Tech. Manual are still available from Timex at PO Box 1378, Little Rock, Ark. 72203. The Schematics \$250. the manual \$25.00. If they don't have them, try T-S Connection, 3832 Waterson, Cincinnati, Ohio 45227 (513) 271-5575. If neither will help, we'll have to Xerox a copy (quality will be poor though). The print out you mentioned, didn't come with the letters.

Down at Timex 2068 -
I recently bought a VOLKS MODEM Vm1.

Unfortunately I can't find any software for it and there is no user group in my area.

If any one in your group has the proper software for this I would appreciate a copy - I'll send stamps to partially cover the cost of mailing it.

I am in the market for a ~~computer~~ printer + have order the Sans Parallel Interface.

MAJ Margaret B Finney
PO Box 832 DEAMC
Ft Gordon GA 30909

There is a new X-Modem (a Standard Public Domain Communications Protocol Developed by Ward Christensen for CP/M machines) vendor who might help:

Weymil Corp., Box 5904, Bellingham, Wa. 98227-5904

Mr. Schumay - Detailed answers to many of these questions are available in LISTing. It costs \$15.00/year

1. Pretty much. The newer ones have pullup resistors. - Z-Link is probably fine. We roll our own.
2. Yes?
3. No, not walk in. Thoughts and Crosses is good.
4. Probably not (not easily, that is).
5. Yes. Article to appear in LISTing and TS Horizons soon.
6. JK Audios old units for the 1000 should be easy to adapt. Radio Shack units too.
7. Subscribe to LISTing. The Spectrum version is useable.

On BSR controllers - See the Vendor Page

Ed.

MAJ FINNEY - That is a tough one. There is a "generic" terminal program from Scott Adams called Spectem which might work (in Spectrum Mode). You need hardware too, though, unless you have an RS 233 interface already.

If you can give us more detail on hardware, Maybe someone can help. Has anyone out there solved this one? (Isn't Volksmodem made by Anchor/Westridge?)

Toledo, OH 43606
April 21, 1985

LIST
BOX 438
Centerport, N.Y. 11721

Mr. Paul Donnelly
Long Island Sinclair/Timex Group
P. O. Box 438
Centerport, NY 11721-0438

Dear Mr. Donnelly:

Your name and address were given to me by Gordon Rockmaker of McGraw-Hill Book Co. I called him recently to get some more information on making an input/output port for my T/S 1000.

I have a book called "BEEPERS" by Mr. Rockmaker, but I am having trouble understanding several points. I have been unsuccessful in making the I/O device in chapter 3^{work} (copy attached). I would like to find out:

- 1) What leads on the card edge are input?
- 2) What leads on the card edge are output?
- 3) What is the specific address/method for addressing output device?
- 4) What is the specific address/method for addressing input monitor?

The nature of my questions and their phrasing probably suggest to you the level of my ignorance. Please feel free to answer any questions not asked. I would appreciate your help in getting started with these projects.

I am also interested joining your organization if you accept long-distance members.

Thanks in advance for your assistance. I'll return the favor if I can. I have enclosed a self-addressed envelope for your convenience.

Sincerely,
Dennis
Dennis Brengartner

Dennis Brengartner
2532 Cheltenham Road
Toledo, Oh. 43606

Dennis:

I hope you enjoy hardware experimenting. I have always found it a fascinating and relaxing (well, most of the time) hobby. These comments, and the attached, should get you on the right track. I had been sent a review copy of Gordon's Book, but told him I really couldn't do a thorough job because exactly the information you are asking for, was missing.

Anyway, here goes.

1) You need an input/output port. This is a device which takes the Data (D0 thru D7) lines and certain control lines (typically IOREQ, or MREQ, RD (for IN) and WR (for output), and selected address lines (there are 16 of these, A0 to A15; usually 3 or 4 are sufficient to decode on I/O port). Of course, you also need +5 volts and ground for the chips. Gordon's port, which treats the I/O as a memory location, uses what is called "memory mapped - I/O". The Byte Back BB-1 module is typical of this type. In that case, almost all the address lines are required and an address between 32764 & 32766 is used. This method is the easiest to use on a TS1000, as PEEK and POKE will work. Decoding in this case uses MREQ, rather than IOREQ.

The more "professional" approach to I/O port mapping is to use IOREQ (called Input/Output Request not). This however, means that machine code I/O requests (usually stored in a 1 REM) are required. In either case, you need a decoder chip (74LS138, 155154) attached to your edge connector lines (D0 to D7, the chosen Address lines, WR (write), RD read, and IOREQ. This chip will "come on" only when a selected combination of the address and control lines occurs. The Data (D0 to D7) lines need to be connected through a buffer, and Gordon uses a 7400 for the output. Typical Port chips include the 8212 (see Syntax), Z80PIO and 8255.

2) You can build your own port. See Jim Stephan's "Powerful Projects with your Timex Sinclair", Scott Foresman Co., 1900 East Lane Avenue, Glenview Ill, 60025 or "Easy Add-On Projects from Spectrum, ZX81, and Ace" by Owen Bishop, Bernard Babani Ltd., The Grampians, Shepherds Bush Road, London W 6NF, England. "Spectrum Hardware Manual" by Adrian Dideus, Melbourne House Publishing, and "Control things with your Timex Sinclair" by Swarts are also good places to start. *

3) Buying a commercial I/O board (many are sold in Kit form) is a good idea, if you want to get started quickly. Try Byte Back, ENER-Z, or Votem for starters. (addresses attached). Budget Robotics sells a nice buffered buss board and may have an I/O board to go with it.

You'll find this kind of information in LISTing, our newsletter. Membership; \$15 per year (Feb. to Jan.), includes a subscription to LISTing. Hope this helps.

Very truly yours,

Paul Donnelly
* Add also E. Floegels "ZX81/Timex Programming in BASIC and Machine Language" Hobacker (elcomp) Box 1194 Pomona, Ca 91769; and finally, Downey & Rindsbergs "Timex/Sinclair Interfacing", Prentice Hall, Englewood Cliffs, N.J. 07632

back issues of ETI Magazine April '83 and August '84 should be of use.

12
List
Group

Wes Brzozowski
337 Janice St.
Endicott, NY 13760
May 19, 1985

To: The membership of that most wonderful organization known as L.I.S.T.

Your May/June issue was excellent, as usual. I hope you might permit me to comment and also to add a bit more information to your descriptions & reprints of some of my work. Because the text in my SINCUS News articles tends to be fairly lengthy, I fully understand your decision to reprint only my schematics. Yet in doing so, a few points that I feel are very crucial had to be left out. I'd like to deal with a couple of the more important ones. Doing this, your readers should be able to use the schematics without conjuring up creatively nasty images of my appearance, personal habits, or the species to which I might belong.

Sadly, I can't cover everything in a single letter. Readers who can consult the original articles in SINCUS News might benefit by doing so. Follow up issues also contain updates and corrections to both of the original articles. Nevertheless, the information presented here should prove adequate enough, in a pinch.

The Interface Zero (microdrive interface) schematic on page 15 is a worthwhile place to start. (Thank you for adding the blocking diode, by the way. My original schematic didn't include it.) A resistor in the lower corner is only marked "see text". This resistor is used to keep the 7806 regulator from running too hot, and the original article suggested that readers experiment with its value. I use 18 ohms, 3 watts.

The Interface Zero has an added benefit that isn't immediately obvious. It's designed so that the Interface One and microdrives don't have to be unplugged while the computer is in the TS2068 mode. Although the microdrive doesn't work without a Spectrum emulator, neither will it crash the computer in this state. I have been able to exercise some control over microdrives, RS-232, and the network while in TS2068 mode, though it requires my own machine code.

I believe that this circuit can be expanded, and used with rewritten Interface One ROM code on an external board, to make it all work with a standard TS2068. This is one reason for the phrase "for future expansion" that appears around the schematic.

Another reason is that this circuit is intended to be part of a complete Bus Expansion Unit (BEU) that will allow additional banks to work along with the home ROM, cartridge, and EXROM banks. (My BEU design is nearly complete.)

My schematic also does some curious things with the IORQ lines. Sinclair's Interface One uses three I/O ports, but the I/O decoding is incomplete (only two bits are checked). Because of this, the sound chip and dock ports in the TS2068 can inadvertently activate some Interface One functions, particularly the networking. Additional hardware is needed if the Interface One is to work properly in the TS2068 mode. The 74LS30 and 74LS04 complete the I/O mapping so that no conflicts exist. To do this, they allow IORQ to appear at the Interface One only when its own ports are being accessed. This means that my circuit will prevent most Spectrum peripherals from working when plugged directly into the rear of the Interface One! In order to make Spectrum peripherals to work, IORQB will have to be brought straight to them from the TS2068, without allowing the signal to "leak back" to the Interface One. This is the price we pay to keep the Interface One from getting confused by some of the extra Timex hardware.

Nazir did a nice job in explaining the method used by John Oliger and myself to interface ROMCS to BE. (Thanks for the kind words too, Nazir.) John's solution is probably the least expensive if it's to be used to upgrade the Twistor, but if anyone chooses to use mine instead, note that one signal was left out when it was redrawn on page 32. It's correct as shown on page 15.

Next, I'd like to comment on my "Extra Simple Spectrum Emulator", shown on page 14. As in the original article, it states that the circuit can be built on a plug in cartridge or attached to the rear connector. However, if attached to the rear connector,

it will prevent any of the Timex plug in cartridges from working in the cartridge slot. To fix this, a switch must be inserted to disconnect either MREQB, RDB, or ROSCS from the Spectrum ROM. The same line should have a 2.2K pullup resistor on the ROM side. Note that this isn't necessary on a plug in cartridge, since you'd have to unplug it to insert the Timex cartridge, anyway.

I'd like to say that the review on the new TC2068 was thorough, informative, and worth the price of the newsletter. If I may, I'd like to offer a couple of ideas for further study with the TC2068. Since the Interface One and appropriate "bridging circuitry" work with the TS2068 only with a Spectrum emulator in control, it would seem that the real incompatibility problem is in the Timex Rom code. It might be worthwhile to try swapping ROMs between the TC2068 and the TS2068. I strongly suspect that if the TC2068 ROMs work in the TS2068 at all, they'll also cause the microdrives to work (with a Twistor, or equivalent).

There are at least two problems in the TS2068 ROMs that prevent the Interface One from working properly. The first is that the new Timex system variables use the same memory space as the Interface One system variables. The Timex variables must be moved.

The second problem is that the shadow ROM in the Interface One also gets paged in when the instruction at 1708 is executed. (Both Logan and Pennel make a brief reference to this in their microdrive books, but it's rarely mentioned, elsewhere.) In a Spectrum this "repairs" some inadequacies in the CLOSE# instruction, but it will totally confound the very different Timex code at that location. As such, the CLOSE# routine has to be put back. There may be other problems, yet undiscovered outside of Timex.

If the TC2068 code does give compatibility, a second way to use it would be to develop a TC2068 emulator. I don't know if this is legal or not, but if so, it would be an interesting exercise. Paul D. tells me that you folks are working on running 16K RAM packs in the cartridge port, and this would be an excellent application. If, for some reason the RAM packs don't work out, there's a schematic for a 16K RAM card for the cartridge port in the Nov 1984 SINCUS News. It's a more expensive solution if you've already got the Timex RAM packs, but it's something to fall back on, if necessary.

If Nazir is fairly confident that his pinout of the TC2068 rear connector is correct, then his suspicion that Timex-P will not introduce a BEU is probably correct. If we check the TS2068 Technical Manual in the listing of RAM resident code, we see that the routines WRITE_BS_REG and READ_BS_REG do a lot of I/O to the sound chip. This controls the rear connector signal IOA5, which switches in memory mapped I/O for the bank switching. However, IOA5 is conspicuously missing from the TC2068 rear connector. If this is true on production models, then the Timex bank switching software can't be used.


It's worth pointing out, though, that it should be possible to put the signal back by adding one wire. Another alternative would be to include a similarly I/O mapped sound chip in the BEU. This would not be very cost effective, but you wouldn't have to open the computer to implement the fix.

Lastly, let me say that I'm delighted that Timex computers will be manufactured again, though I'm just a bit skeptical that they will remain in the U.S. market for long. (Please let me be wrong!) In such a depressed home computer market, and with the leading positions established so long ago, it may require more than an excellent and superior product for it to catch on. (Maybe we can persuade Commodore and Atari to jointly file for bankruptcy?) Nonetheless, though I'm not superstitious, my fingers will remain tightly crossed over the next few months.

I'm sorry that this letter got so long. I guess I had more to say than I first thought. Anyone and everyone is welcome to write to me at the above address with questions or comments. Those wanting a reply should enclose a stamped, self addressed envelope, unless they're swapping ideas or information, in which case they can do anything they want.

Thanks for providing a forum in which I can "sound off". I remain;

Sincerely yours,


Wes Brzozowski

LIST

Group

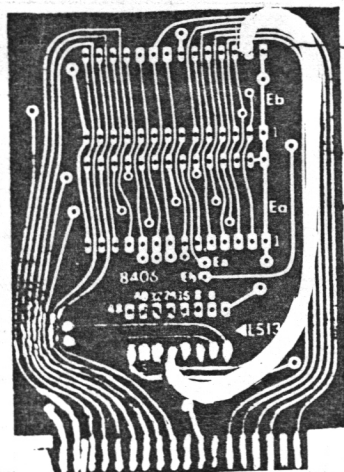
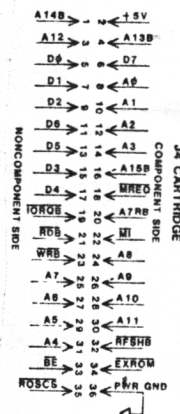
July

Subject INTERFACE ZERO (W. BIZUBOWSKI) on
AN OLIGER 2068 READ BOARD.

Modifications to Convert Oliger Board to Interface Zero (i.e., use Spectrum ROM in cartridge port)

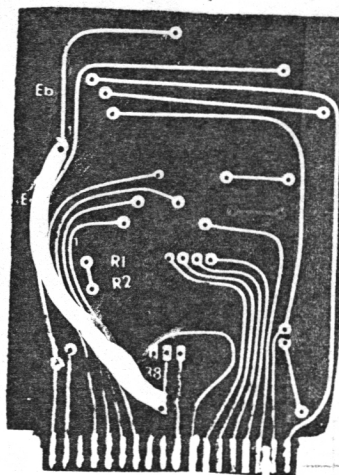
NOTES:

- 1) The Boards are not shown actual size, nor are all the other traces necessarily correct.
- 2) The very heavy white traces shown are simple wire (insulated) jumpers which connect: MREQ (A18 on J4) to OE1 (Pin 27 on ROM)
RDB (A21 on J4) to OE2 (Pin 22 on ROM)
- 3) The Spectrum ROM goes in the top or "B" socket as we have shown it.
- 4) You can still use the (a) socket for an EPROM (ROS) when the ROM is not in use and/or use it as an easy way to add the pullup resistors on D0, D1 and D3 through D7. Plug one end in the appropriate pin slot and all the others ends to B+.



CUT TRACE
FROM PIN 27 to Pin 28

NOTE ON
(A) SOCKET
HOW TRACE
(27-28) IS NOT
CUT.



ROM
SHOWN IN
'B' SOCKET
ON TOP

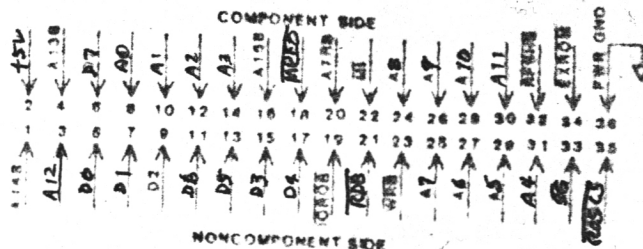


PIN ARRANGEMENT



Read Only Memory

J4 CARTRIDGE
COMPONENT SIDE



LIST

communications

What is your FIRST name? Jennifer
(Press retust name" question)
What is your last name? donnelly
Hi, JENNIFER DONNELLY
Y/N Did I get your name right? y
(NOTE: This correcting is only done if +
his is your
first time on the system.)

Logging name to disk...
You are caller # 41614
Newill be 08803
There are 0555 active msg.

Checking for messages to you...
Sorry. No messages for you today

F
←?

Function: A,B,C,D,E,F,G,H,I,K,M,N,O,??

----Functions Supported----

A=Alter Baud rate
B=Reprint bulletin
C=Case switch (upper/lower)
D=Duplex switch (echo/no echo)
E=Enter msg into system
F=File downloading
G=Good bye (leave system)
H=Help with functions
I=Instapoll (tm LICA)
K=Kill msg from system
M=Print the 'Stack'
N=Nulls: Set as many as req'd
O=Other bulletin board numbers
P=Prompt switch (BELL on/off)
Q=Quick summary (Msg #, subject)
R=Retrieve msgs by #
S=Summarize msgs
T=Print date, time, elapsed time
U=Video backspace
W=Reprint welc=Print caller #, hi msg #,
msgs
Function: A,B,C,D,E,F,G,H,I,K,M,N,O,P,Q,
R,S,T,U,W,X,#
(or ? if not known)→?

Type Control-K or K to abort.
Type Control-Cge.
Type Control-S or S to pause, any key to
continue.

Last Update 5/8/85

LICA Supports The Use Of All Other Bulletin Board Systems In The NY-Metro Area. If You Are A SYSOP, And Wish To Be Added To This List, Please Leave Us Your System Name, Telephone #, Your name, And System Specialty (If Any) In A Message For Us.

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> Direct Access To CP/M 300/1200 baud (auto select)

Here's an actual on-line session with LICA's BBS. (Sorry about the print quality)

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Specialty	Telephone #	Code(s)	Source
RIBBS	201 272-1874		Bruce Ra
toff			
T.A.B.	201 376-8055		Brett St
ack	Adventures	*	
ABBS ACGNJ	201 753-1225		Pompton
Plains			
	201 790-6795		Alan Hyman
Photography			
ABBS CCNJ	201 835-7228		201
842-7644	Lincroft, NJ	6-Mid M,W,Sun	
ABBS Wyckoff	201 891-7441		Ralph Ro
ehrich			
ABBS ACGNJ	201 968-1074		Dunellin
NJ			
COMMUNIQUE-80	201 992-4847		Andy Fri
sch			
J-->			
BROOMS 0	203 744-4644		Joe+Simo
n			
J-->			
TFC ABBS N.Y.C.	212 799-3577		Adrian S
teckel			
TICKERSCREEN	212 986-1660		Max Ule
& Assoc.Stocks	\$+		
CONNECT-80/NYC	212 991-1664		Al Cowle
s			
J-->			
THE BLACK HOLE	516 231-0343		D. Finke
lstein			
ELECT. MAILMAN	516 234-0925		
TRS-80/GEN'L	/ *		
HARDWARE HAVEN	516 328-8209		
L.I.S.E. TRS-80	516 338-4083		Bill Ra
erty			
MIDAS	516 367-8619		Marc Man
del			
CAT'S MEOW	516 374-4683		Emily Ro
bbins C-64 4-10P WKDYS	#		
M-BOARD	516 473-1005		Bill Wohlar
s			
INNOV-80 offer			
MODEMTOWN	516 484-6844		J. Velas
co 7p-7a wkdays 24hrs/wknds			
ROUNDTA	IBM		*
!			
LICA UNIX	516 541-7949		Stan Mis
el	*		
LICA LIMBS CBBS	516		*
TELETREND	516 581-8696		M.A. Leo
ne Fone Info	\$*		
SCAMS ATARI BBS	516 586-9765		Rick Wat
erson	*		
CONNECTI. Vande-Stouwe			
COMPUTER WORLD	516 666-1319		Ron Nehr
ing	!		
GOLDEN TEMPLE	516 674-4059		Alfred L
evitt	*		
GULL BBS-64	516 681-0751		Joe Toma
sone			
PIRATES COVE	516 698-4008		
Apple User's	*		
HAM RADIO BBS	516 736-2208		N. Stern
berg 6p-8a wkdays/24hr wknds			
TEXACOM	516 757-2227		R.K. Jim
inez On-line pgms	6p-6A		
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THE MONASTERY	516 825-2753		Chris Ca
puto			
THE REVOLUTION	516 877-1184		Mike
io DISCUSSION	*		
IBM-LNW BBS	516 924im		Edwardson
!			
PORT PC RBBS	516 944-6712		Michael
Krieger IBM PC board	!		
J-->			
Lunatic Asylum	718 253-0032		Lee Plan
code	*		
BAMS	718 362-1040		Roger Ker
plan	*		
CONNECT-80/QNS	718 441-3755		Robert R
osersHACK	*\$		
CONNECT-80/S.I.	718 442-3874		Staten I
sland NY	*		
RAVEN BBS	718 471-9015		Joe Hure

Byte-Back RS-232 and TASWORD TWO

The following information will allow you to use your Byte-Back RS-232 and the TASWORD TWO word Processing software on your Timex 2068.

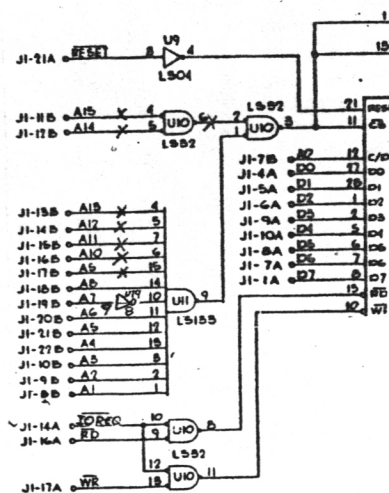
A few hardware changes will be required which will require a soldering iron. If you are unable to make these changes yourself, Byte-Back will be glad to make them for you and will charge our normal repair fee of \$25.00

1) Cut the traces leading to Pins 4,5,6,7,14, and 15 of the 74LS133. This is the IC which has another IC piggybacked on top of it. Now solder all of the above Pins to the 74LS133 Pin 16.

2) Cut the trace leading to the 74LS32 Pin 2 and solder a jumper wire from this Pin to the 74LS04 or 74F04 Pin 7.

3) Now load TASWORD TWO and exit to basic. Make the following changes:

add lines:	1 OUT 127,0	and POKE the following:
	2 OUT 127,0	POKE 57978,32
	3 OUT 127,0	57979,12
	4 OUT 127,64	57997,79
	5 OUT 127,205	57998,205
	6 OUT 127,55	57999,9
		58000,32
		58001,56
		58002,2
		58003,207
		58004,12
		58005,0
		58006,219
		58007,127
		58008,203
		58009,127
		58010,32
		58011,2
		58012,24
		58013,240
		58014,203
		58015,67
		58016,40
		58017,236
		58018,121
		58019,211
		58020,126
		58021,201
		58022,201



Now return to TASWORD TWO by RUN and exit to the menu and save your new version of TASWORD TWO with all of these changes built in. You do not need to load the Printer driver Program when using this Program. Please note that this hardware modification in no way effects the operation of the RS-232 and that this Program modification is set to run at 4800 BAUD so adjust your Printer for 4800 also.

THANK YOU! BYTE - BACK!

BYTE-BACK

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INC.

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MD-68 for TS2068

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NOT AVAILABLE FOR TS2068

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- * this is not a nonvolatile ram!

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BB-68 for TS2068

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- * 8 independent relays
- * 8 led status indicators to monitor status of relays
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- * 8 logic inputs

RS-232 RS-232 for ZX81,TS1000,TS1500
RS-232-68 for TS2068

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- * C.ITOH 7500AR serial printer available separately

PARALLEL PARALLEL 1000 for ZX81,TS1000,TS1500
PARALLEL 2068 for TS2068

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CARD # _____ EXP DATE _____

__ I HAVE ENCLOSED A CHECK OR MONEY ORDER

NAME _____

ADDRESS _____

CITY/STATE/ZIP _____

PHONE _____

LESSONS LEARNED ON THE USE OF JOYSTICK PORTS FOR I/O

1) Most joystick connector cables have only 6 wires, just those needed to allow the reading of up to 5 switches. If you want more than to just determine if a switch is closed, find a cable with all 9 conductors present.
(Philmore, CEO of Mark Elec. in Beltsville)

2) Not all 2058's have pin 9 at ground; mine does not, so I added a jumper from the dock connector ground to the right side port connector.

3) Data rates are rather low if the port is controlled by a BASIC program, probably less than 70 baud.

4) The port is set for input at power up. To switch to output, execute SOUND 7,64. The data is output by SOUND 14,data. To switch back to input mode, execute SOUND 7,0. To read data use STICK. (The BASIC commands IN and OUT can also be used; this involves more statements and is slower.) The value of the data byte of course depends on which pins you want to go high or low. E.G. pin 1 is bit 0; if only pin 1 is to be high then "data"=1.

5) At power-up, all bits are set; e.g. a LED connected from pin 1 to ground will be lit. The STICK function will return 0. Now if you switch to the output mode and write a 0, all bits are reset, i.e. the LED goes out.

6) Any data written to the port is latched. If you later switch to the input mode and read some input data, it may reflect what you previously wrote. For example, write a 1, then read the port with STICK; the result is 14. This indicates that bit 0 is still set and the other bits are low, so the STICK function thinks only pin 1 (bit 0) is not grounded.

M.S. Morris

Thanks to CATS Newsletter

I've run some quick tests and this works! You can easily make a 4 Bit input (regular joystick mode) Port and a 4 Bit output Port (the other joyport hooked up as an output port). Tougher yet, but theoretically possible - Who can design a \$5.00 Centronics printer port this way?

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-CASSETTE RE-INDERS-

I keep running total accounts **SAVEd** on my TS 1000. (Stock portfolio balances, fitness workouts, checkbook balances, etc) I hate to **SAVE** twice. If I save but once, every other day, I am only out one day if I goof. But, where is that last day? Pencil and paper I don't use. What's a computer (even TS 1000) for? I put two **SAVEs** on one side of tape, and alternate between the two. To remember, I tape a strip of film paper to label part of the cassette from side to side. Then I loop another strip around that, fold flat and tape the end. Voila! Slide it from side to side to indicate where the last **SAVE** is (was?) Good for the absent-minded. Now all you have to do is remember to rewind to the beginning of the last **SAVE** so you start in the right place. I haven't found anything to help me with that. STEW VANCE -

0 OK, 0:1



LIST Group

READ DATA

FOR ZX 81 - TIMEX 1000

By: Walter Bader

PUT ALL DATA INTO ONE STRING (D\$)

Separate data by commas (,) put a comma at end followed by STOP (SHIFTED A)
(no commas may be in the DATA) (see note)
When you return to your program from the Read Subroutine, the current data
element will be in R\$.

1. INITIALIZE: (must be processed before any READ statements)

DATA LINES (LET D\$ = " data, data, data,"
(LET D\$ = D\$ + " data, data, etc., STOP "

LET READ = (gosub line #)
LET RP = 0

2. READ STATEMENTS

GOSUB READ
(LET variable = VAL R\$
(LET string variable = R\$

3. RESTORE STATEMENTS

LET RP = 0

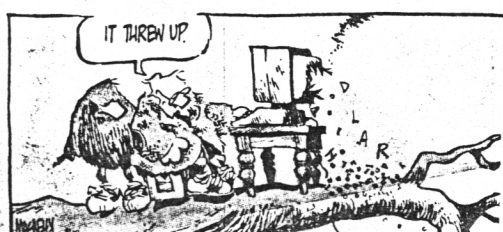
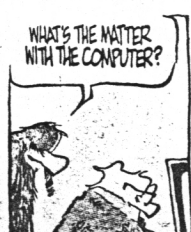
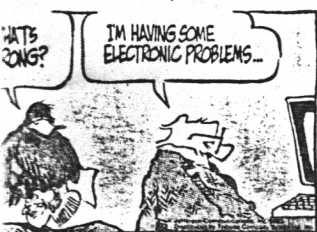
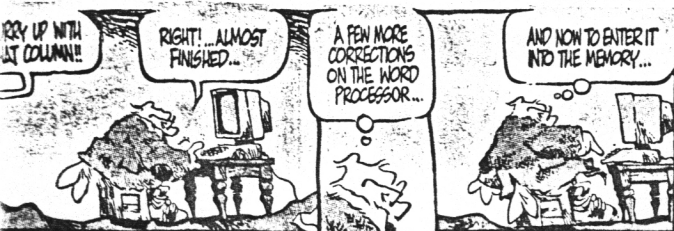
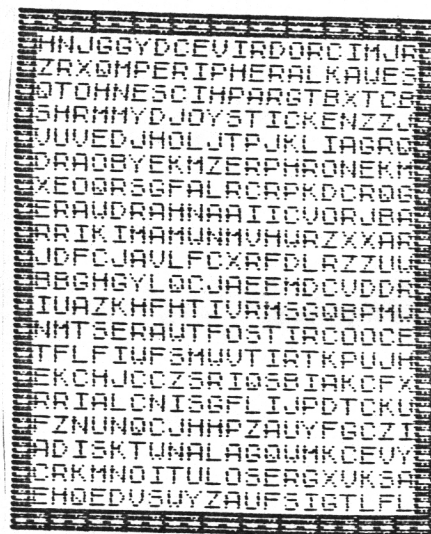
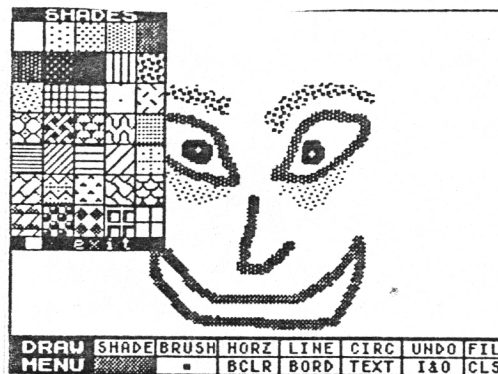
4. SUBROUTINE (AT LINE # READ)

LET DP = RP + 1
IF D\$(DP) = "STOP" THEN GOTO READ + 6
LET RP = RP + 1
IF D\$(RP) = "," THEN GOTO READ + 2
LET R\$ = D\$(DP TO RP - 1)
RETURN
PRINT "OUT OF DATA"; END

5. VARIABLES USED

D\$ - DATA STRING
R\$ - DATA RETURN
DP - DATA POSITION
RP - READ POSITION
READ - GOSUB LINE #

NOTE: IF A COMMA MUST BE USED, SUBSTITUTE A TOKEN OR GRAPHIC FOR ALL COMMAS
(SUGGEST LLIST)



TS PUZZLE

Here is a word square puzzle that was generated by a program contributed by Joan Healy. Look for as many words having to do with TIMEX/Sinclair computing, as you can find. Send your answers back to me:

Abilene TSUG
c/o Chris Nystrom
609 E.N. 18th
Abilene, Texas 79601

and I will a list the names and the number of words each person found.

Modem intercom—This little trick has helped solve many modem problems. If you have two computers and two modems, you can get them to talk to each other over two phones on one line in your home. With both ends of the link in one building, troubleshooting becomes a snap.

Simply pick up the phone and wait for the loud beeping to stop. It will take a minute or two, but it will eventually stop. Plug that phone into your modem (or switch from T to D if you have a 1650). Then pick up an extension phone and do the same for that. You should now be able to converse between two computers on a single line!

Mike Mann
New Smyrna Beach, FL

Glaring nerdhood—Don't have a glare screen for your monitor? Just wear polarized sunglasses whenever you're computing. Your family may think you're withdrawing further into the tube, but you're really just saving money.

Mike Rogalski
Monrovia, CA

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longer to reach us.

LIST

COMPUTER DICTIONARY

Terms

Some commonly found in the literature and our analysis of what they may mean.

SYMBLES - Something which stands in for something else used in SOUND tables.

ADD - Short for advertisement

COMPUTOR - A machine which thinks it's a person who computes.

COPYWRITE - Something which protects what you "write"

MIKRODRIVE - Very small drive from Greece.

DISC DRIVE - Mass storage unit, used in Olympics.

PERIMETERS - Values you set, usually for variables around the edges of your program.

CURSER - What you become, after a crash and loss of the little blinking "K".

BUSS - The part where a computer and peripherel kiss.

PERIPHEREL - Ephemeral add-on e.g., TIMEX BEU.

MONITER - Video Display Unit used on first confederate submarine.

CARDREDGE (cartredge) - Something used by the Corps of Engineers.

ARTARI TAPES - Originally though to be mytical replacements for cartridges, games are now available from STARPATH (Toys 'R' us) on tape.

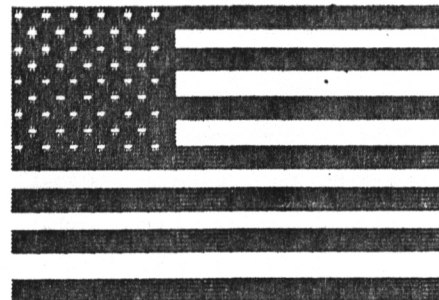
BITES - Sections of computer memory composed of 8 bytes

FIRMWEAR, SOFTWARE, HARDWEAR - What you wear to computer shows.

HOBBIEST - Someone who studies EST as a pasttime.

ALINEMENT - Used on tape recorders. A chalk line is strung across the recording head to check how straight it is.

BAWD RATE - How fast your computer can send out naughty bits.



```

5 REM old glory
10 FOR I=0 TO 11
15 FOR J=2 TO 11
20 PRINT INK 1;AT J,I;
25 NEXT J
30 NEXT I
40 FOR I=12 TO 31
50 PRINT INK 2;AT 2,I;
60 FOR J=3 TO 16 STEP 2
70 PRINT AT J,I;
80 NEXT J
90 NEXT I
100 PRINT INK 2;AT 3,12;
110 PRINT INK 2;AT 4,12;
120 PRINT INK 2;AT 5,12;
130 PRINT INK 2;AT 7,12;
140 PRINT INK 2;AT 8,12;
150 PRINT INK 2;AT 10,12;
155 PRINT INK 2;AT 11,12;
170 PRINT INK 2;AT 13,0;
180 PRINT INK 2;AT 14,0;
185 PRINT INK 2;AT 15,0;
190 PRINT INK 2;AT 16,0;
200 PRINT INK 2;AT 18,0;
210 PRINT INK 2;AT 19,0;
220 LET I$="* * * * *"
230 LET B$="* * * * *"
235 PAUSE 10
240 OVER 1: PRINT INK 1;AT 2,0;
I$;AT 3,0;B$;AT 4,0;I$;AT 5,0;B$
250 OVER 1: PRINT INK 1;AT 6,0;
I$;AT 7,0;B$;AT 8,0;I$;AT 9,0;B$
AT 10,0;I$
270 GO TO 270

```

LIST Group

LIST Group

LIST Group
LIST Group

LIST Group

LIST Group
LIST Group

LIST Group

LIST Group

LIST Group

0 OK, 520:1

COPY

```

5 LET A$="LIST Group"
10 FOR I=0 TO 2
20 FONT 1
30 PRINT A$
40 NEXT I
50 FONT 1
60 PRINT A$
70 FONT 2
80 PRINT A$
90 COPY
100 GO TO 500
110 FADE 254
120 FOR I=1 TO 4
130 MODE 2,I
140 PRINT A$
150 NEXT I
160 FONT 1
170 LET A$="LIST"
1800 SPRINT 18,32,5,5,A$
2000 LET B$="GROUP"
2010 SPRINT 16,96,5,5,B$

```

This little gem was written in YS(Your Spectrum) MEGA BASIC, an excellent enhancement to Sinclair BASIC. It has windows, 3 Fonts, several character sizes, single keystroke entry (you must type P-R-I-N-T to enter PRINT) and much more. Full review soon. Don't Try to enter this program unless you have Mega BASIC.

In keeping with the time of year, Harvey P. has donated this flag: just in time. Harvey also sent in a copy of "The Directory of Software Publishers" Edited by Eric Balkan. If you're planning on selling your software commercially, this might help get you started. The book can be borrowed from the Library - or purchased. Make Harvey an offer. There are Timex listings. FOR The 2068

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CURRY COMPUTER
5344 West Banff Lane
Glendale, Az. 85306

21st Century Electronics
PO Box 5037
Guttenburg, N.J. 07093

Damco(Roto Tronics)
67 Bradley Court
Fall River, Ma. 02720
(D. Maccarone is a List Member) (617)678-2110

Scott Foresman
1900 East Lake Avenue
Glenview, Il. 60025

Games to Learn By
PO Box 78
Collinville, Ct 06022 203-673-7089

Peter McMullin
2340 Queen St. E.
Toronto, Ontario
Canada M4E 1G9

Speedy Soft
87 Howard's Lane
London SW15 6NU, England

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707 Highland Street
Fulton, N.Y.13069 (315) 593-8219

Ramex International
17620 26 Mile Road
Washington, Mi. 48094 (313) 781-5800

Robotron Industries
1417 Wauwatosa Avenue
Wauwatosa, Wi. 53213 Dept 640

TS Horizone
2002 Summit Street
Portsmouth, Oh 45662

T-Ware
40 Aspen
Great Falls, Mt. 59405
Chuck Goldwater
714 Wimbledon Lane
Livermore, CA 94550
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Mscript \$74.00 (Total)
List Price Vendor.
Memotech also

Wafa-Drive - (2 drives RS 232 &
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\$230 includes Spectrum Emulator

New Book: "Computer Interfacing
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CDN for WS II - W.P. Interesting
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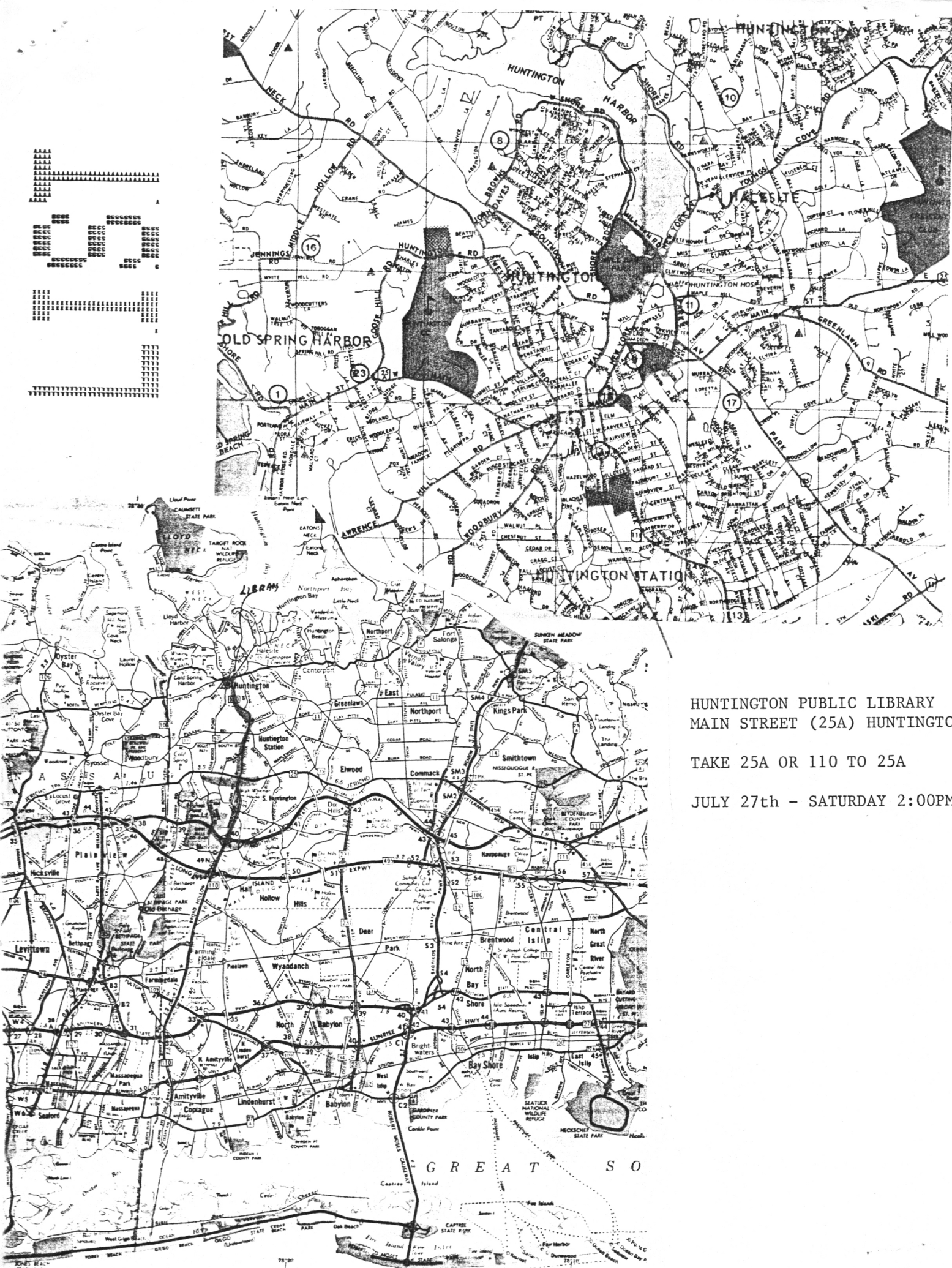
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